FINAL REPORT

Microbiological Sampling Report

for

National Oceanic & Atmospheric Administration

Samplings Conducted on the Sixth Floor of Building SSMC-3 on April 30, 2001

Interagency Agreement #: D8H01CO31200
Task: 0-12

July 19, 2001

Prepared by
US Public Health Service
Division of Federal Occupational Health
Bethesda Central Office

Executive Summary

At the request of the National Oceanic & Atmospheric Administration (NOAA), Department of Health and Human Services, Division of Federal Occupational Health (FOH) conducted a microbiological sampling in cubicles 6302, 6303, 6304, 6320, 6321, 6322, 6358, and 6362 of Building SSMC-3, located at 1315 East-West Highway, Silver Spring, Maryland. Sampling was conducted on April 30, 2001. Andersen® air, swab, and vacuum carpet dust samples were collected from these cubicles and an indoor reference cubicle 6215. Air samples were also collected from outdoors.

Findings are as follows:

- Low fungal levels were detected from indoor Andersen samples. Indoor fungal levels were lower than those of outdoors.
- *Stachybotrys chartarum* was not detected from any air, swab, or dust samples collected.
- Fungal levels on furniture surfaces ranged from below the detection limits of 3 CFU/in^2 to 125 CFU/in^2. Yeast dominated these samples followed by *Aureobasidium.*
- Low fungal levels (< 3 CFU/in^2 – 90 CFU/in^2) were detected from wipe samples collected from surfaces of supply diffusers and return troughers in light fixture. *Aureobasidium* dominated these samples followed by yeast.
- Fungal levels in carpet dust of these cubicles were at 10^3 - 10^4 CFU/g of fine dust levels, levels similar to those samples collected in February 2000.

INTRODUCTION

At the request of the National Oceanic & Atmospheric Administration (NOAA), Department of Health and Human Services, Division of Federal Occupational Health (FOH) conducted a microbiological sampling in cubicles 6302, 6303, 6304, 6320, 6321, 6322, 6358, and 6362 of Building SSMC-3, located at 1315 East-West Highway, Silver Spring, Maryland. Sampling was conducted on April 30, 2001. Andersen® air, swab, and vacuum carpet dust samples were collected from these cubicles and an indoor reference cubicle 6215. Air samples were also collected from outdoors.

EVALUATION METHODOLOGY

Air Samples

Various types of samples were collected from these cubicles on April 30, 2001. Andersen® air samples were collected from cubicles 6302 and indoor reference 6215. Indoor air samples were collected for 3 minutes and outdoor samples were collected for both one and three minutes. Two percent (2 %) malt extract agar (MEA) and cellulose Czapek agar (CCA) was used to recover general fungi and cellulose-loving fungi, respectively.

Swab Samples

Swab samples were collected from surfaces of supply diffusers and return troughers, and horizontal surfaces in each cubicle. They were collected by wiping a known area (4 in^2) of surface with a sterile cotton swab (Culturette®) wetted with holding media. The swab was then placed directly into its holder. Each holder was labeled with an identifiable number. A total of 24 wipe samples were collected from these cubicles.

Vacuum Dust Samples

Dust accumulated on carpeting of each cubicle were collected with a High Efficiency Particulate Air (HEPA) vacuum attached with a special "sock" device. For each carpet sample, a 3-ft by 3-ft area was vacuumed for at least five minutes.

All samples collected were sent for next morning delivery to FOH's Environmental Microbiology Laboratory (EML) in Philadelphia, Pennsylvania for analysis.

Laboratory Procedures

Upon receipt, all Andersen® air samples were incubated in a 25°C incubator. Each swab sample was suspended in sterile distilled water, diluted serially, and inoculated onto agar plates. Both MEA and CCA were used for retrieving fungi. At least three dilution series were used for each sample. Each vacuum dust sample was sieved through a 250 μm sieve. Approximately 100 mg of fine dust (< 250 μm) retrieved were used for fungal analysis by aforementioned dilution plating.

All plates were incubated in a 25°C incubator. They were examined every other day for up to 10 days to ensure the full recovery of fungi. Fungal identification was based on colony morphology, spores and conidia formation. Total fungal colonies formed on each MEA plate and *Stachybotrys chartarum* on CCA plates were counted and recorded.

Fungal levels in samples were presented as colony forming units (CFUs) per measuring unit. For example, CFU/m^3 for Andersen® air samples, CFU/in^2 for swab samples, and CFU/g of fine dust for vacuum dust samples.

RESULTS AND DISCUSSION

All laboratory analytical reports are presented in Attachment A in a laboratory report #NOAA-01-14R.

Andersen Air Samples

No fungal growth was detected from cubicle 6302 while 24 CFU/m^3 was detected in cubicle 6215, the reference area. Outdoor airborne fungal levels were 330 and 459 CFU/m^3 (Table 1). *Cladosporium* was the predominant fungal genus detected outdoors. Other fungi detected were *Alternaria, Aspergillus sp.* (*Aspergillus fumigatus* included), *Epicoccum, Paecilomyces,* and Basidiomycetes. *Stachybotrys chartarum* was not detected from these samples.

Table 1. Airborne fungal levels at different cubicles of the 6th floor in SSMC-3 on April 30, 2001.

Cubicles / Parameters	6302	6215 reference	Outdoors
Airborne Fungal Levels (CFU/m^3)	< 35	24	330* 459

* Two samples were collected from outdoors.

Swab Samples

Eleven out of 24 samples collected from surfaces of supply diffusers, return troughers, and furniture were below the detection limits (BDL) (3 CFU/in^2). The highest fungal levels on surfaces of supply, return, and furniture were 48, 90, and 125 CFU/in^2, respectively. *Aureobasidium* and yeast dominated these samples. Other fungi recovered from these samples were *Alternaria, Aspergillus, Cladosporium, Epicoccum, Penicillium,* and *Ulocladium. Stachybotrys chartarum* was not detected.

Vacuum Dust Samples

Diverse fungal genera such as *Alternaria, Aspergillus, Aureobasidium, Cladosporium, Epicoccum, Mucor, Paecilomyces, Penicillium, Trichoderma,* Ascomycetes, and Basidiomycetes were recovered from carpet dust samples. Fungal levels in carpet fine dust in carpeting of these cubicles were at the levels of $10^3 - 10^4$ CFU/g of fine dust (Table 2), similar to those samples collected on February 17, 2000. *Stachybotrys chartarum* was not detected from any sample (Table 2).

Table 2. Total fungal levels (CFU/g of fine dust) in carpet fine dust collected various cubicles on the 6th floor of SSMC-3, by vacuum dust sampling, collected on February 17, 2000 and April 30, 2001.

Cubicles **Dates**	**6745**	**6747**	**6855**	**6215 ref[&]**	**6302**	**6303**	**6304**	**6320**	**6321**	**6322**	**6358**	**6362**
2/17/00	5,200 (+*)	13,861 (+)	5,545 (-)	NA[#]	NA	NA	NA	NA	NA	NA	NA	NA
4/30/01	NA	NA	NA	3,922 (-)	7,921 (-)	3,564 (-)	8,000 (-)	2,353 (-)	6,000 (-)	14,000 (-)	9,109 (-)	12,400 (-)

[&] Indoor reference.

* +: *Stachybotrys chartarum* was detected on MEA and/or CCA plates.
-: *Stachybotrys chartarum* was not detected on MEA and CCA plates.

[#] Samples not available.

CONCLUSIONS

- Low fungal levels were detected from indoor Andersen samples. Indoor fungal levels were lower than those of outdoors.
- *Stachybotrys chartarum* was not detected from any air, swab, or dust samples collected.
- Fungal levels on furniture surfaces ranged from below the detection limits of 3 CFU/in^2 to 125 CFU/in^2. Yeast dominated these samples followed by *Aureobasidium.*
- Low fungal levels (< 3 CFU/in^2 – 90 CFU/in^2) were detected from swab samples collected from surfaces of supply diffusers and return troughers in light fixture. *Aureobasidium* dominated these samples followed by yeast.
- Fungal levels in carpet dust of these cubicles were at 10^3 - 10^4 CFU/g of fine dust levels, levels similar to those samples collected in February 2000.

RECOMMENDATIONS

- Conduct thorough HEPA vacuuming and wet-wiping of furniture in these cubicles.
- Conduct any above ceiling plenum work after office hours. Thoroughly HEPA vacuum the surrounding areas afterwards.
- Implement an emergency water intrusion protocol for this building to adequately manage any unexpected water intrusion in order to prevent fungal proliferation.

ATTACHMENT A

Microbiological laboratory report #NOAA-01-14R for samples collected from the sixth floor of SSMC-3, on April 30, 2001.

USPHS DFOH ENVIRONMENTAL MICROBIOLOGY LABORATORY, PHILADELPHIA, PA

LABORATORY REPORT #NOAA-01-14R

Client agency: National Oceanic and Atmospheric Administration, Silver Spring, MD

POIS#/task #: D8H01CO31200 / 0-12
Sampling date: 4/30/01
Dates of inoculation: 4/30/01 (airs), 5/1/01 (wipes), and 5/2/01(dust)
General location: SSMC-3, Silver Spring, MD
Specific location: 6th floor
Sampling techniques: Air (Andersen N-6 sampler), wipe, and vacuum dust samplings
Medium used: Malt extract agar (MEA) and cellulose Czapek agar (CCA) for fungi
Samples submitted by: J. Sobelman
Date characterization completed: 5/14/01

(A) Air samples on MEA and CCA plates

Sample ID	Sampling Location	Air Volume (L)	Fungi on MEA @ 25° C	*Stachybotrys chartarum* on CCA @ 25° C
6302 A1	6th floor, room 6302, complaint area	84.9	No fungal growth CFU/m^3 < 35	Absent
6215 A1	6th floor, room 6215, control	84.9	1. *Cladosporium* (1*) 2. yeast (1) CFU/m^3 = 24	Absent
OA3	Outside	84.9	1. *Cladosporium* (17) 2. *Alternaria* (3) 3. *Penicillium* (2) 4. *Aspergillus fumigatus* (1) 5. *Aspergillus sp.* (1) 6. *Epicoccum* (1) 7. *Paecilomyces* (1) 8. Basidiomycetes (2) CFU/m^3 = 330	Absent
Sample ID	**Sampling Location**	**Air Volume (L)**	**Fungi on MEA @ 25° C**	***Stachybotrys chartarum* on CCA @ 25° C**
OA1	Outside	28.3	1. *Cladosporium* (9) 2. *Aspergillus sp.* (2) 3. *Alternaria* (1) 4. *Epicoccum* (1) CFU/m^3 = 459	Absent

(B) Wipe samples on MEA and CCA plates

NOAA-SSMC-3 6th floor
Survey April, 2001

Sample ID	Sampling Location	Area (in^2)	Dilution factor	Fungi on MEA @ 25°C	*Stachybotrys chartarum* on CCA @ 25° C
W1	6th floor, room 6302, supply	4	10X-MEA 10X-CCA	No fungal growth CFU/in^2 < 3	Absent
W2	6th floor, room 6302, return	4	10X-MEA 10X-CCA	No fungal growth CFU/in^2 < 3	Absent
W3	6th floor, room 6302, tabletop	4	10X-MEA 10X-CCA	No fungal growth CFU/in^2 < 3	**Absent**
W4	6th floor, room 6320, supply	4	10X-MEA 10X-CCA	1. yeast (1) CFU/in^2 = 3	Absent
W5	6th floor, room 6320, return	4	10X-MEA 10X-CCA	No fungal growth CFU/in^2 < 3	Absent
W6	6th floor, room 6320, desk top	4	10X-MEA 10X-CCA	1. *Aureobasidium* (2) 2. *Cladosporium* (1) 3. *Penicillium* (1) 4. yeast (15) CFU/in^2 = 48	Absent
W7	6th floor, room 6358, supply	4	10X-MEA 10X-CCA	1. *Cladosporium* (1) CFU/in^2 = 3	Absent
Sample ID	**Sampling Location**	**Area (in^2)**	**Dilution factor**	**Fungi on MEA @ 25°C**	***Stachybotrys chartarum* on CCA @ 25° C**
W8	6th floor room 6358, return	4	10X-MEA 10X-CCA	No fungal growth CFU/in^2 < 3	Absent
W9	6th floor, room 6358, desk top	4	10X-MEA 10X-CCA	1. yeast (15) CFU/in^2 = 38	Absent
W10	6th floor, room 6362, return	4	10X-MEA 10X-CCA	No fungal growth CFU/in^2 < 3	Absent
W11	6th floor, room 6362, top of printer	4	10X-MEA 10X-CCA	1. *Aureobasidium* (6) CFU/in^2 = 15	Absent
W12	6th floor, room 6321, supply	4	10X-MEA 10X-CCA	1. *Alternaria* (1) 2. yeast (1) CFU/in^2 = 5	Absent
W13	6th floor, room 6321, return	4	10X-MEA 10X-CCA	1. *Aureobasidium* (19) 2. *Cladosporium* (1) CFU/in^2 = 50	Absent
W14	6th floor, room 6321, desk	4	10X-MEA 10X-CCA	1. yeast (50) CFU/in^2 = 125	Absent
W15	6th floor, room 6322, return	4	10X-MEA 10X-CCA	1. *Aureobasidium* (36) CFU/in^2 = 90.	Absent
W16	6th floor, room 6322, top of system furniture	4	10X-MEA 10X-CCA	No fungal growth CFU/in^2 < 3	Absent
W17	6th floor, room 6304, return	4	10X-MEA 10X-CCA	No fungal growth CFU/in^2 < 3	Absent
W18	6th floor, room 6304, table top	4	10X-MEA 10X-CCA	1. yeast (27) CFU/in^2 = 68	Absent

Sample ID	Sampling Location	Area (in^2)	Dilution factor	Fungi on MEA @ 25°C	*Stachybotrys chartarum* on CCA @ 25° C
W19	6th floor, room 6303, supply	4	10X-MEA 10X-CCA	1. *Alternaria* (2) 2. *Epicoccum* (2) 3. *Aspergillus sp.* (1) 4. yeast (1) CFU/in^2 = 15	Absent
W20	6th floor, room 6303, return	4	10X-MEA 10X-CCA	1. No fungal growth CFU/in^2 < 3	Absent
W21	6th floor, room 6303, desk	4	10X-MEA 10X-CCA	1. *Aureobasidium* (1) 2. *Cladosporium* (1) 3. *Ulocladium* (1) 4. yeast (5) CFU/in^2 = 20	Absent
W22	6th floor, room 6215, supply	4	10X-MEA 10X-CCA	1. *Aureobasidium* (14) 2. *Epicoccum* (2) 3. *Penicillium* (2) 4. *Alternaria* (1) CFU/in^2 = 48	Absent
W23	6th floor, room 6215, return	4	10X-MEA 10X-CCA	**No fungal growth** CFU/in^2 < 3	Absent
W24	6th floor room 6215, desk	4	10X-MEA 10X-CCA	No fungal growth CFU/in^2 < 3	Absent
Blank	Laboratory blank	NA	10X-MEA 10X-CCA	No fungal growth	Absent

(C) Vacuum dust samples on MEA and CCA plates

Sample ID	Sampling Location	Weight (g)	Dilution factor	Fungi on MEA @ 25°C	*Stachybotrys chartarum* on CCA @ 25° C
VD1	6th floor, room 6302, carpet	0.101	40X-MEA 10X-CCA	1. *Cladosporium* (6) 2. *Paecilomyces* (5) 3. *Penicillium* (5) 4. *Aureobasidium* (4) **CFU/g = 7,921**	Absent
VD2	6th floor, room 6320, carpet	0.102	40X-MEA 10X-CCA	**1. *Cladosporium* (3)** 2. *Paecilomyces* (1) 3. *Penicillium* (1) 4. *Trichoderma* (1) **CFU/g = 2,353**	Absent
VD3	6th floor, room 6358, carpet	0.101	40X-MEA 10X-CCA	1. *Cladosporium* (14) 2. *Aureobasidium* (2) 3. *Aspergillus niger* (1) 4. *Aspergillus sp.* (1) 5. *Epicoccum* (1) 6. *Mucor* (1) 7. *Trichoderma* (1) 8. Ascomycetes (1) 9. Basidiomycetes (1) CFU/g = 9,109	Absent

Sample ID	**Sampling Location**	**Weight (g)**	**Dilution factor**	**Fungi on MEA @ 25°C**	***Stachybotrys chartarum* on CCA @ 25° C**
VD4	6th floor, room 6362 carpet	0.100	40X-MEA 10X-CCA	1. *Cladosporium* (16) 2. *Aureobasidium* (4) 3. *Epicoccum* (4) 4. *Alternaria* (3) 5. *Paecilomyces* (2) 6. *Nigrospora* (1) 7. Ascomycetes (1) CFU/g = 1.2×10^4	Absent
VD5	6th floor, room 6321, carpet	0.100	40X-MEA **10X-CCA**	**1. *Aureobasidium* (9)** 2. *Cladosporium* (5) 3. *Penicillium* (1) **CFU/g = 6,000**	Absent
VD6	6th floor, room 6322, carpet	0.100	40X-MEA 10X-CCA	**1. *Aureobasidium* (6)** 2. *Cladosporium* (6) 3. *Epicoccum* (3) 4. *Penicillium* (3) 5. *Alternaria* (2) 6. *Chaetomium* (1) 7. Ascomycetes (14) CFU/g = 1.4×10^4	Absent
VD7	6th floor, room 6304, carpet	0.100	40X-MEA 10X-CCA	**1. *Cladosporium* (14)** 2. *Aspergillus sp.* (2) 3. *Paecilomyces* (2) 4. *Alternaria* (1) 5. *Penicillium* (1) **CFU/g = 8,000**	Absent

Sample ID	Sampling Location	Weight (g)	Dilution factor	Fungi on MEA @ 25°C	*Stachybotrys chartarum* on CCA @ 25° C
VD8	6th floor, room 6303, carpet	0.101	40X-MEA 10X-CCA	**1. *Aureobasidium* (7)** 2. *Alternaria* (1) 3. *Nigrospora* (1) **CFU/g = 3,564**	Absent
VD9	6th floor, room 6215 carpet	0.102	40X-MEA 10X-CCA	**1. *Cladosporium* (4)** 2. *Aureobasidium* (3) 3. *Alternaria* (1) 4. *Nigrospora* (1) 5. *Rhizopus* (1) **CFU/g = 3,922**	Absent

* Colony counts.
\# Not applicable.